Urological Science xxx (2017) 1–5

Contents lists available at ScienceDirect

Urological Science

journal homepage: www.urol-sci.com

Original article

One day hospitalization for trans-rectal ultrasound guided prostate biopsy: Experiences of a single institution

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ARTICLE INFO

Article history:
Received 18 November 2016
Received in revised form
19 April 2017
Accepted 2 May 2017
Available online xxx

Keywords:
trans-rectal ultrasound guided prostate biopsy
sepsis
one day hospitalization
prostate cancer

ABSTRACT

Objective: To investigate one-day hospitalization for trans-rectal ultrasound guided prostate (TRUSP) biopsy.

Materials and methods: From September 2009 to September 2012, 218 consecutive patients hospitalized for TRUSP biopsy in our hospital were enrolled. All were hospitalized for observation for one day after the procedure. Patients who were not discharged on the planned date or who were re-admitted were categorized as the "changed hospitalization plan" group. Perioperative laboratory data and variables were checked and recorded for statistical analysis to examine the differences between patients with and without changed hospitalization plan. The causes of changing hospitalization plans were recorded for descriptive analysis.

Results: There were 202 (92.7%) patients discharged on the planned date and 16 (7.3%) for whom the hospitalization plan was changed. There were no statistical significances in laboratory tests between the groups; age was the only variable that was statistically significantly different ($p = 0.032$), especially in patients aged over 77 ($p = 0.033$).The most common causes of changing the hospitalization plan were urinary retention (n = 10, 4.6%) and fever (n = 6, 2.8%) which included sepsis (n = 3, 1.4%). Two of the three patients with sepsis were re-hospitalized.

Conclusion: Age over 77 was the only significant risk factor for changed hospitalization plan. However, Postoperative fever was uncommon in patients hospitalized for one day for TRUSP biopsy. Prolonged admission to prevent rare cases of sepsis may be not reasonable.

1. Introduction

Prostate cancer is diagnosed by abnormal digital rectal examination findings and/or prostate specific antigen (PSA) elevation followed by trans-rectal ultrasound-guided prostate (TRUSP) biopsy for tissue proved. Prostate biopsy is a common procedure in daily urologic practice with many possible complications such as sepsis, Fournier's gangrene, and even mortality.[1] The sepsis-related mortality rate of TRUSP biopsy is rare (0.095% in the Prostate, Lung, Colorectal and Ovarian Cancer Screening trial, 0.13% in Taiwan, 0.24% in the European Randomized Study of Screening for Prostate Cancer (ERSPC) trial).[2–4] Sepsis may occur after prostate biopsy regardless of whether it is performed in an outpatient or inpatient setting.

TRUSP biopsy can be performed in outpatient or inpatient settings, and a higher admission rate was noted in Taiwan. The National Health Insurance (NHI) database revealed that more than half of patients (6885/12,968, 2006–2010) underwent TRUSP biopsy while hospitalized in Taiwan.[4] Based on cost effectiveness and complication risk, TRUSP biopsy has been performed as a one-day hospitalization procedure in our hospital and many other hospitals in Taiwan. Considering the limitation of the strict payment system of the NHI, prolonged hospitalization of more than one day has not been feasible, so it became important to investigate the complications of one-day hospitalization for TRUSP biopsy. To date there have been no previous articles directly addressing this issue; we therefore reviewed our cases to assess the appropriateness of one-day hospitalization for TRUSP biopsy.

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http://dx.doi.org/10.1016/j.urols.2017.05.001

Please cite this article in press as: Cheong I-S, et al., One day hospitalization for trans-rectal ultrasound guided prostate biopsy: Experiences of a single institution, Urological Science (2017), http://dx.doi.org/10.1016/j.urols.2017.05.001

2. Materials and methods

This study was approved and certified by the Institutional Review Board of Chiayi Christian Hospital, Chiayi, Taiwan (CYCH IRB no: 104064). From September 2009 to September 2012, 218 consecutive patients who were hospitalized for TRUSP biopsy in our hospital were enrolled in this study (Table 1). In the regular hospitalization plan, they stayed in hospital for one day for observation. Some patients had prolonged hospitalization or were re-hospitalized after discharge, which we referred to as "changed hospitalization plan." Prior to biopsy, most of the patients had started a five-day prophylactic antibiotic regimen (two days preoperatively, the operative day, and two days postoperatively) of combined oral levofloxacin and metronidazole. Fleet enema was performed before the procedure in the morning of the operative day. TRUSP biopsies were performed in the afternoon. Patients were discharged on the next day if there was no fever or significant hematuria.

We compared the following variables between patients with and without a changed hospitalization plan: age, prostate volume, repeat biopsy, diabetes mellitus, hypertension, anticoagulant use, PSA, biopsy cores, pre-operative pyuria, pre-operative white blood cell (WBC) count, pre-operative WBC classification: segment (Seg) percentage, pre-operative blood glucose, pre-operative creatinine, pre-operative liver function tests: glutamic oxaloacetic transaminase (GOT) and glutamic pyruvic transaminase (GPT), prothrombin time (PT), activated partial thromboplastin time (APTT), and pathology result (benign or malignant). Furthermore, the causes of changing hospitalization plans were recorded in detail for descriptive analysis.

Septic patients were particularly noted and studied. Sepsis was defined according to the Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3).[5]

Descriptive and comparative analyzes were performed using IBM SPSS Statistics 21.0 software (IBM Corp., Armonk, NY, USA). Three types of statistical analyzes were used; the independent-sample t test, the Mann–Whitney U test, and the chi-squared test were used to examine differences in variables between the groups with and without changed hospitalization plans. To find the cut-off point of age with statistical significance, we performed statistical analysis every age with chi-squared test respectively. The characteristics of the causes of prolonged hospitalization and re-hospitalization were also recorded, compared, and investigated.

3. Results

Altogether, 218 consecutive patients received TRUSP biopsies with one-day hospitalization (Table 1). The median age was 73 years (25th–75th percentile, 66–77), the median prostate volume was 50.2 ml (25th–75th percentile, 38.5–69.7), the median PSA was 11.05 ng/ml (25th–75th percentile, 7.15–22.48), and the median number of biopsy cores was 10 (25th–75th percentile, 10–12). Combined oral antibiotic treatment with levofloxacin plus metronidazole was prescribed for 184 patients (84%), and ciprofloxacin was prescribed for 14 patients (6%) (Table 1).

Table 1
Characteristics of men undergoing prostate biopsy.

Patients (n)	218
Hypertension (n)	77
Diabetes mellitus (n)	35
Age (years)	
Median	73
25th–75th percentile	66–77
Prostate volume (ml)	
Median	50.2
25th–75th percentile	38.5–69.7
PSA (ng/ml)	
Median	11.05
25th–75th percentile	7.15–22.48
Biopsy cores (n)	
Median	10
25th–75th percentile	10–12
Main prophylactic antibiotics (n)	Levofloxacin plus metronidazole (184) Ciprofloxacin (14) Other (20)

The hospitalization plan changed in 16 of 218 patients (7.3%). The causes are listed in Table 2, and included fever, acute urine retention (AUR), hematuria, sepsis, and anal bleeding. The main causes of changed the hospitalization plan were AUR (n = 10, 4.6%) and fever (n = 6, 2.8%). The most severe cause was sepsis (n = 3, 1.4%). Comparing the hospitalization plan changed group (n = 16) with the hospitalization plan not changed group (n = 206), there were no statistically significant differences in prostate volume, PSA, pre-operative WBC, Seg, blood glucose, creatinine, GOT, GPT, PT, or APTT. There were also no statistically significant differences in biopsy cores, pre-operative pyuria, pathology result, repeat biopsy, diabetes mellitus, hypertension, or anticoagulant use. Age was the only variable in which there was a statistically significant difference between the groups ($p = 0.032$), particularly in patients aged over 77 ($p = 0.033$) (Table 3).

There were six cases of fever. Among these six patients, three developed life-threatening sepsis and needed vasopressors for maintaining blood pressure and intensive care. The infection courses were rapid, with sepsis occurring only a few hours after the fever. All of these patients had been on a five-day prophylactic antibiotic regimen (including two days preoperatively, the operative day, and two days postoperatively) with combined oral levofloxacin and metronidazole. The pathogens were *Escherichia coli* (*E. coli*) in blood culture and urine culture in one patient, *E. coli* in only the blood culture in the second patient, and there was no pathogen growth in any culture from the final patient. All *E. coli* strains were resistant to levofloxacin. The sepsis occurred on postoperative day (POD) one, three, and four. Two of the patients were in the re-hospitalization group, and the chief complaints of these patients were fever, and exhaustion and weakness. The patients recovered without any sequelae.

4. Discussion

In our study, 16 patients had a changed hospital plan (n = 16, 7.3%), and the main causes of changing hospitalization plan were AUR (n = 10, 4.6%) and fever (n = 6, 2.8%) which included three cases of sepsis. The most severe complication was sepsis (n = 3, 1.4%). Two of these three septic cases were re-hospitalized patients. Age was the only significant risk factor for changing the

Table 2
Causes of changed hospitalization plans.

	Prolonged hospitalization	Re-hospitalization[a]	Total n, (%)
Number	n = 11	n = 5	n = 16 (7.3%)
Mean hospital stay	4.54 days	7.8 days	
Urine retention	8	2	10, (4.6%)
Fever	2	4	6, (2.8%)
Sepsis[b]	1[c]	2[d]	3, (1.4%)
Anal bleeding	2	0	2, (0.9%)
Hematuria	1	0	1, (0.5%)

[a] The mean interval between hospital discharge and re-hospitalization was 1.4 days.
[b] All sepsis occurred several hours after fever.
[c] Sepsis occurred on postoperative day (POD) 1.
[d] Sepsis occurred on POD 3, POD 4.

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